

ATLAS OF ANTENNAL TRICHOBOTHRIA IN THE PACHYNOMIDAE AND REDUVIIDAE (HETEROPTERA)

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Abstract.—Antennae of Reduviidae comprising adults of 99 species in 19 subfamilies and nymphs of 25 species in 7 subfamilies, and one species of Pachynomidae were examined using compound light and scanning electron microscopy. Figures are presented indicating the numbers and distribution of trichobothria, the range being from 1–20 or more.

Trichobothria are well known in the Heteroptera, occurring ventrally on the abdomen in the Trichophora (Schaefer, 1975), on the femora in the Miridae (Schuh, 1975), on the scutellum in the Prostemmatinae (Nabidae) (Carayon, 1970), and elsewhere in other groups of true bugs, as well as in other groups of insects and arthropods (see Schuh, 1975, for a brief survey). Those occurring on the second antennal article of the Reduviidae were first described in detail by Lent and Wygodzinsky (1979) for the Triatominae. Their first record of occurrence in the Pachynomidae was that of Carayon and Villiers (1968), who referred to the structures on the third antennal article as trichobothrioform sensilla, pending histological investigation; they also documented the occurrence of trichobothria on the abdomen in this group.

In the present paper we document the occurrence of antennal trichobothria in adults of one species of Pachynomidae and 99 species of Reduviidae and nymphs of 25 species of Reduviidae. Because of the limited variation in numbers and distribution of the trichobothria and the limited understanding of phylogenetic relationships among the currently recognized subfamilies of Reduviidae, we have not attempted a detailed analysis of the taxonomic value of these structures.¹ Nonetheless some very general conclusions can be drawn.

The presence of antennal trichobothria in the Pachynomidae and Reduviidae suggests a possible sister group relationship between the two taxa, as proposed by Schuh (1979). Within the Pachynomidae, which have five apparent antennal articles, the position of the trichobothrium suggests that the second article—the pedicel—is the one that has undergone subdivision. The occurrence of a single trichobothrium in the Pachynomidae and some first instar Reduviidae (no information is available for nymphal Pachynomidae) suggests that the primitive number is probably one. Con-

¹ Furthermore, because of the failing health of the senior author during the data-gathering phase of the project, it was not possible to prepare a more complete analysis of the available information. The results presented here are offered in the anticipation that future workers will use them as a base for additional work elucidating relationships between the Pachynomidae and Reduviidae, and among the higher groups of Reduviidae, on the basis of antennal trichobothria as well as other structures.

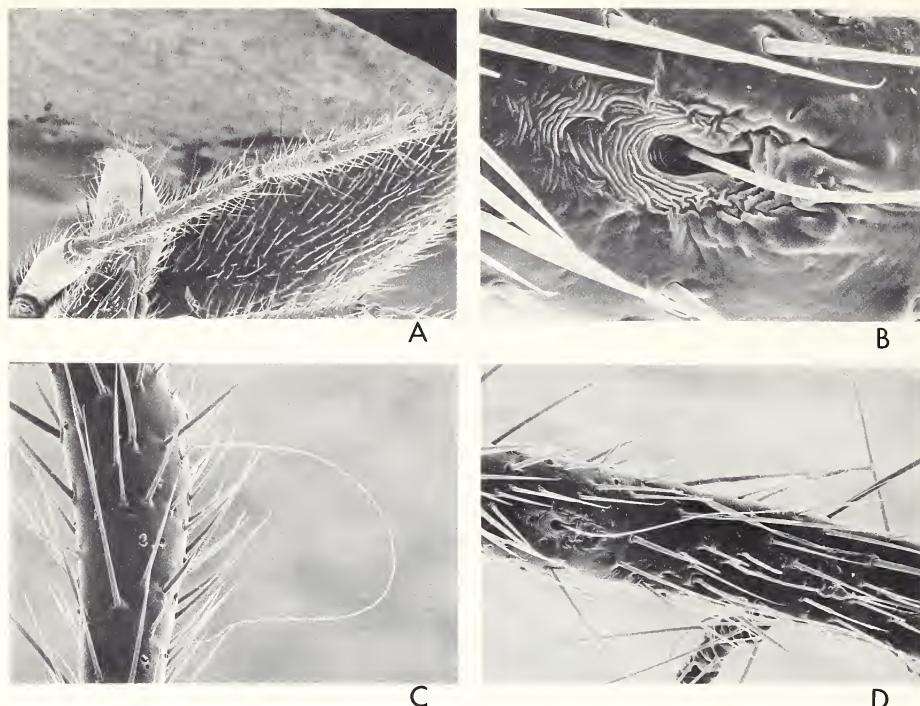


Fig. 1. SEM micrographs of Pachynomidae. A-D. *Aphelonotus* sp. A. 140 \times . B. 2,500 \times . C. 750 \times . D. 650 \times .

trary to Lent and Wygodzinsky (1979) it is evident that some first instar Reduviidae have more than one trichobothrium (e.g., *Amphibolus venator*, Figs. 1L-O), and it appears that all Reduviidae have antennal trichobothria as adults.

The figures presented below are organized by subfamily, those groups with the lowest numbers first, those with higher numbers toward the end. To facilitate use of this work, we present the following list, organized alphabetically by subfamily and species, with the figure numbers.

LIST OF TAXA STUDIED

Family Pachynomidae

Aphelonotus sp. (Figs. 1A-D; 6O-Q).

Family Reduviidae Subfamily Apiomerinae

Agriocoris sp. (Fig. 17H, I).

Amauroclopius sp. (Fig. 17L).

Apiomerus sp. (Fig. 17J, K).

Calliclopius sp. (Fig. 17M).

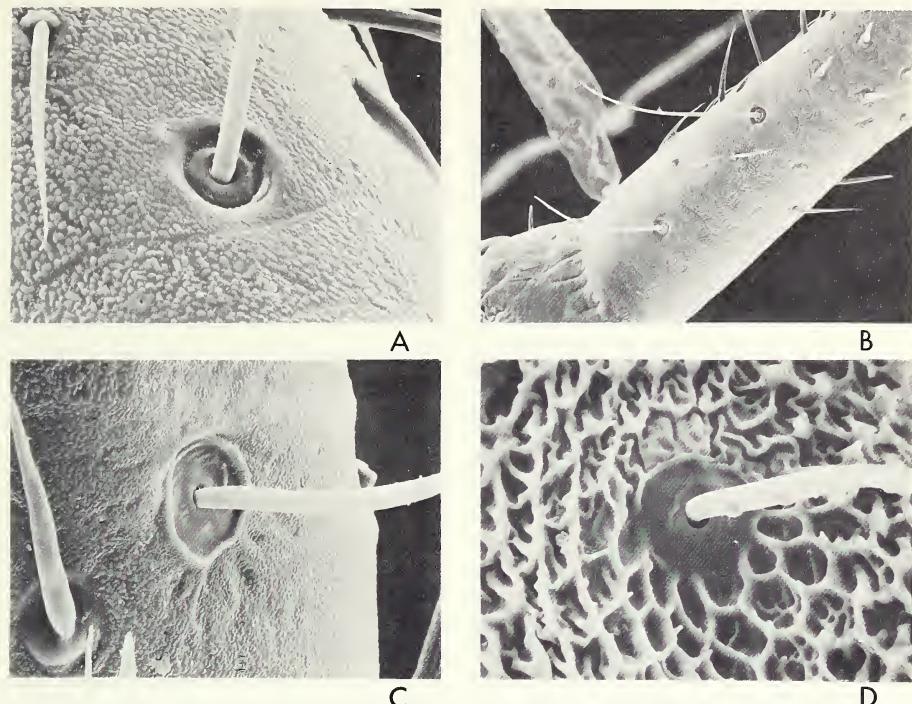


Fig. 2. SEM micrographs of Reduviidae. A, B. *Eupheno pallens*. A. 2,200 \times . B. 440 \times . C. *Leogorus litura*, 2,000 \times . D. *Phymata georgiensis*.

Heniartes erythromerus Spinola (Fig. 17F).

Heniartes flavicans (Fabr.) (Fig. 17D, E).

Heniartes maestralis Fracker & Bruner (Fig. 17B, C).

Heniartes sp. (Fig. 17G).

Manicocoris sp. (Fig. 17A).

Micrauchenus sp. (Fig. 17N).

Subfamily Centrocneminae

Centrocnemis sp. (Fig. 6L).

Subfamily Cetherinae

Cethera sp. (Fig. 10A-C).

Eupheno pallens (Laporte) (Figs. 2A, B; 10H).

Eupheno sp. (Fig. 2M).

Subfamily Ectrichodinae

Bayerus sp. (Fig. 13K, L).

Cricetopareis tucumana (Berg) (Figs. 3C, D; 13B, C).

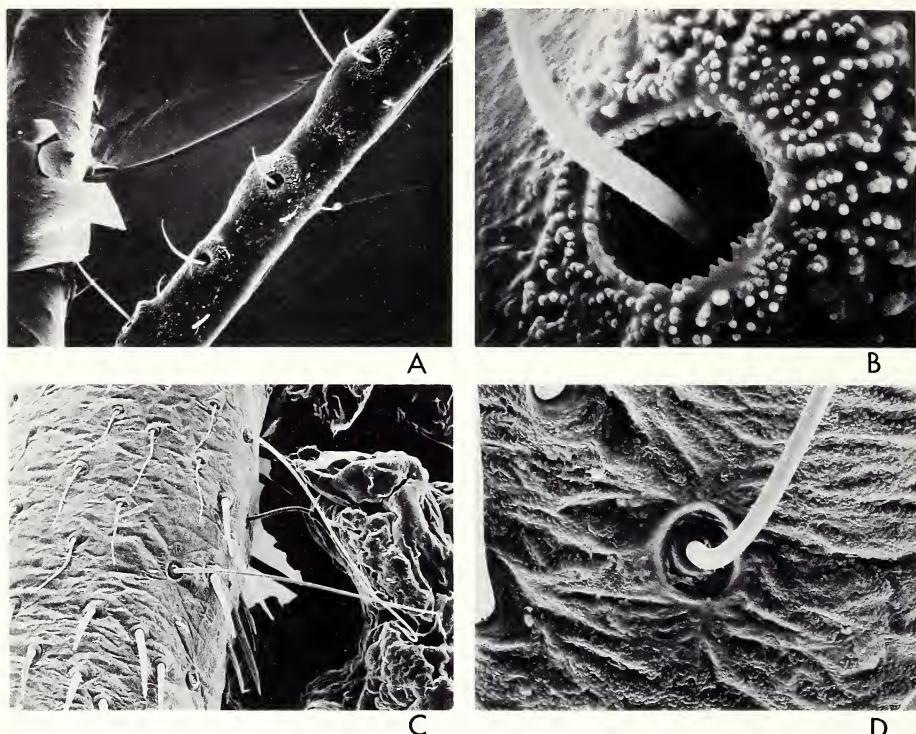


Fig. 3. SEM micrographs of Reduviidae. A, B. *Barce* sp. C-D. *Cricetopareis tucumana*. C. 400 \times . D. 1,600 \times .

Daraxa sp. (Fig. 13G, H).

Ectrichodia crux (Thunberg) (Fig. 13D, E).

Katanga etiennei Schouteden (Fig. 13M).

Pothea lugens (Fabr.) (Fig. 13A).

Racelda sp. (Fig. 13I, J).

Vilius sp. (Fig. 13F).

Zirita limbata Breddin (Fig. 18C).

Subfamily Emesinae

Barce fraternus (Say) (Fig. 9D, E).

Barce sp. (Fig. 2A, B).

Bergemesa brachmanni (Berg) (Fig. 9C).

Bettyella marita Wygodzinsky (Fig. 9B).

Empicoris rubromaculatus (Blackburn) (Fig. 18A, B).

Ploaria chilensis (Philippi) (Fig. 9A).

Stenolemus pallidipennis McAtee & Malloch (Fig. 8L).

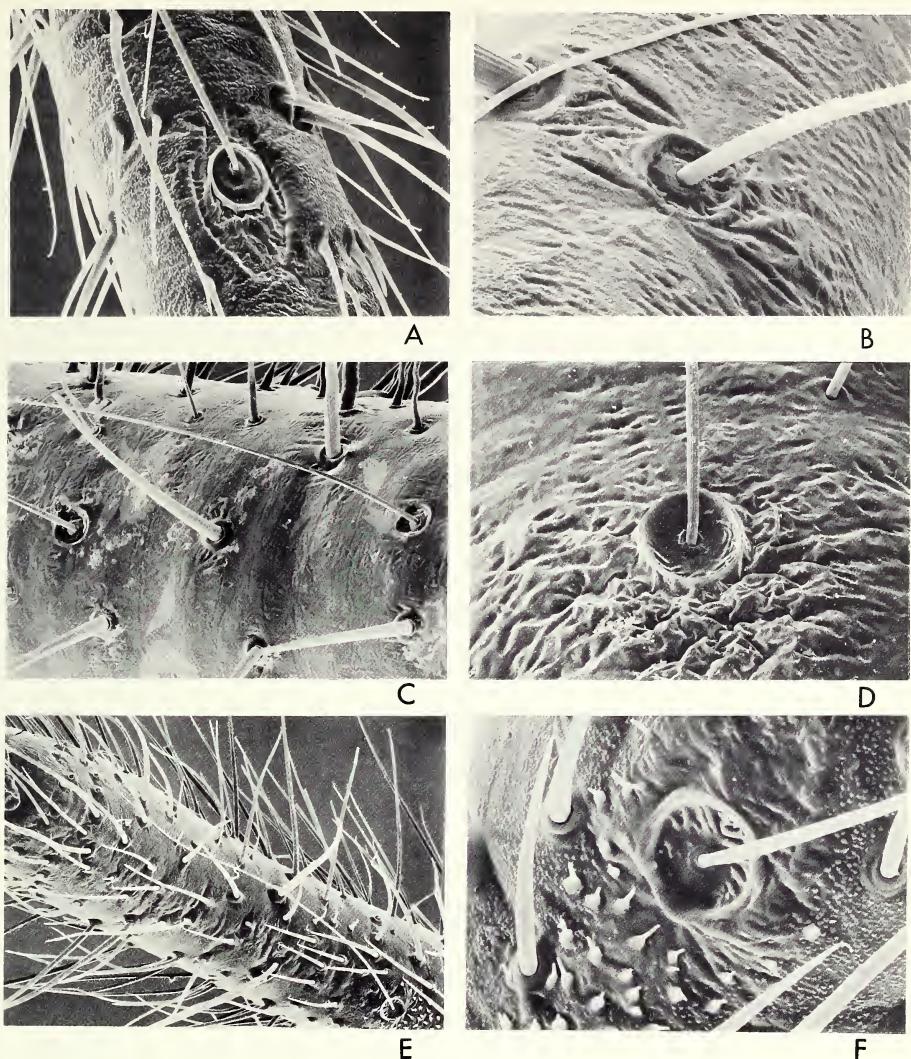


Fig. 4. A. SEM micrographs of Reduviidae. *Pygolampis* sp., 100 \times . B. *Reduvius personatus*, 1,900 \times . C. *Sphaeridops amoenus*, 450 \times . D. *Sphaeridops amoenus*, 1,100 \times . E. *Tribelocephalus* sp., 400 \times . F. *Tribelocephalus* sp., 2,000 \times .

Subfamily Harpactorinae

Amphibolus venator Klug (Figs. 13H-I; 15L-P).

Arilus sp. (Figs. 13L, M; 15U).

Atrachelus cinereus (Fabr.) (Fig. 13C, D).

- Bactrodes femoratus* (Fabr.) (Fig. 13N, O).
Castolus ferox Banks (Fig. 15J-K).
Castolus lineatus Maldonado (Fig. 15R, S).
Erbessus sp. (Fig. 16P).
Havinthus rufovarius Bergroth (Fig. 16K).
Notocyrtus sp. (Figs. 15Q; 16E-G).
?*Repipta flavicens* (Fig. 15T).
Rhaphidosoma didiera Jeannel (Fig. 15I).
Ricolla quadrispinosa (Linné) (Fig. 15A-F).
Sinea diadema (Fabr.) (Figs. 16A, B; 18G).
Yolinus sp. (Fig. 16J).
Zelus exsanguis Stål (Fig. 15G-H).

Subfamily Microtominae

- Homalocoris* sp. (Fig. 8D).
Microtomus gayi (Spinola) (Fig. 8C).
Microtomus purcis (Drury) (Fig. 8A, B).

Subfamily Phimophorinae

- Phimophorus spissicornis* Bergroth (Fig. 18K).

Subfamily Phymatinae

- Anthylla nervosopunctata* Signoret (Fig. 6E).
Macrocephalus tuberosus Westwood (Fig. 6G).
Paragreuoocoris aethiopicus Carayon (Fig. 6F).
Phymata georgensis Melin (Fig. 2D).
Phymata pennsylvanica Handlirsch (Fig. 6A-D).
Phymata stali Melin (Fig. 6H-I).

Subfamily Physoderinae

- Physoderes* sp. (Fig. 6J, K).

Subfamily Peiratinae

- Brachysandalus ephippiger* White (Fig. 14L).
Catamiarus brevipennis (Serville) (Fig. 14F).
Chryxus sp. (Fig. 6M).
Ectomocoris cordatus (Wolff) (Fig. 14H, I).
Fusius rubricosus Stål (Fig. 18E).
Melanolestes abdominalis (Herrich-Schaeffer) (Fig. 14G).
Nalata sp. (Fig. 14M).
Peirates sanctus (F.) (Fig. 14E).
Psophis sp. (Fig. 6N).
Rasahus biguttatus (Say) (Fig. 14C).
Rasahus hamatus (Fabr.) (Fig. 14J, K).
Rasahus sulcicollis (Serville) (Fig. 14A, B).

Sirthenea flavipes (Stål) (Fig. 14D).

Tydides rufus (Serville) (Fig. 14N).

Subfamily Reduviinae

Inara flavopicta Stål (Fig. 10D).

Leogorrus formicarius (Fabr.) (Fig. 11F, G).

Leogorrus litura (Fabr.) (Figs. 2C; 11L–N).

Microlestria sp. (Fig. 11R, S).

Neivacoris sp. (Fig. 5N).

Pasira perpusilla (Walker) (Fig. 11H, I).

Reduvius personatus (Linné) (Figs. 4B; 11J, K).

Sphedanovarus camerunensis (Breddin) (Fig. 11O–Q).

Velitra philippina Stål (Fig. 11A, B).

Zelurus circumcinctus (Hahn) (Fig. 11D, E).

Zelurus spinidorsis (Gray) (Fig. 18D).

Zelurus weyrauchi Lent & Wygodzinsky (Fig. 11C).

Subfamily Saicinae

Gallobelgicus sp. (Fig. 9G, H).

Oncerotrachelus acuminatus (Say) (Fig. 9I, J).

Polytoxus sp. (Fig. 18H).

Saica apicalis Osborn & Drake (Fig. 9F).

Subfamily Salyavatinae

Salyavata nigrofasciata Costa Lima (Fig. 8K).

Salyavatinae sp. (Fig. 8F–J).

Subfamily Sphaeridopinae

Sphaeridops amoenus (Lepeletier & Serville) (Figs. 4C, D; 8E).

Subfamily Stenopodainae

Apronius sp. (Fig. 18F).

Ctenotrachelus sp. (Fig. 18J).

Kodormus bruneosus Barber (Fig. 7J, K).

Oncococephalus nubilus Van Duzee (Fig. 7A–C).

Pnironitis languida Stål (Fig. 7F–I).

Pygolampis sp. (Fig. 4A).

Staccia sp. (Fig. 18I).

Stenopoda cinerea Laporte (Fig. 7D, E).

Subfamily Triatominae

Belminius peruvianus Herrer, Lent & Wygodzinsky (Fig. 12I).

Eratyrus mucronatus Stål (Fig. 5L).

Panstrongylus chinai (Del Ponte) (Fig. 12A, B).

- Panstrongylus megistus* (Burm.) (Fig. 12C).
Paratriatoma hirsuta Barber (Fig. 5P).
Psammoleses arthuri (Pinto) (Fig. 5O).
Rhodnius neivai Lent (Fig. 5J).
Rhodnius neglectus Lent (Fig. 5K).
Triatoma barberi Usinger (Fig. 5H).
Triatoma infestans (Klug) (Fig. 12D, E).
Triatoma lecticularia (Stål) (Fig. 5D).
Triatoma lenti Sherlock & Serafim (Fig. 5I).
Triatoma longipennis Usinger (Fig. 5C).
Triatoma maculata (Erichson) (Fig. 5B).
Triatoma platensis Neiva (Figs. 5E; 12G, H).
Triatoma protracta (Uhler) (Fig. 5G).
Triatoma rubida (Uhler) (Fig. 5A).
Triatoma vitticeps (Stål) (Figs. 5F; 12F).

Subfamily Tribelocephalinae

- Tribelocephalus* sp. (Fig. 4E, F).
Tribelocephalinae sp. (Fig. 10I).

Subfamily Vescinae

- Pessoaria ?piratoides* Costa Lima (Fig. 10J–M).
Vescia sp. (Fig. 10N, O).

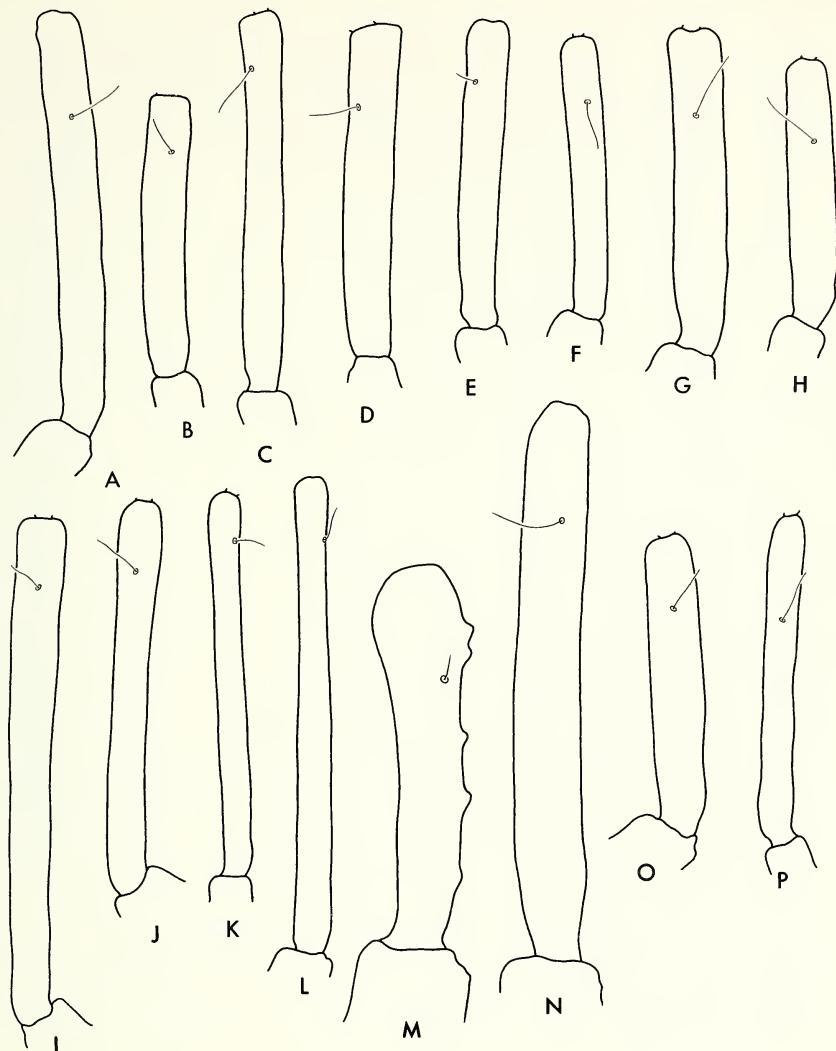


Fig. 5. Reduviidae—5th instar nymphs. A. *Triatoma rubida*. B. *Triatoma maculata*. C. *Triatoma longipennis*. D. *Triatoma lecticularia*. E. *Triatoma platensis*. F. *Triatoma vitticeps*. G. *Triatoma protracta*. H. *Triatoma barberi*. I. *Triatoma lenti*. J. *Rhodnius neivai*. K. *Rhodnius neglectus*. L. *Eratyrus mucronatus*. M. *Eupheno* sp. N. *Neivacoris* sp. O. *Psammolestes arthuri*. P. *Paratriatoma hirsuta*.

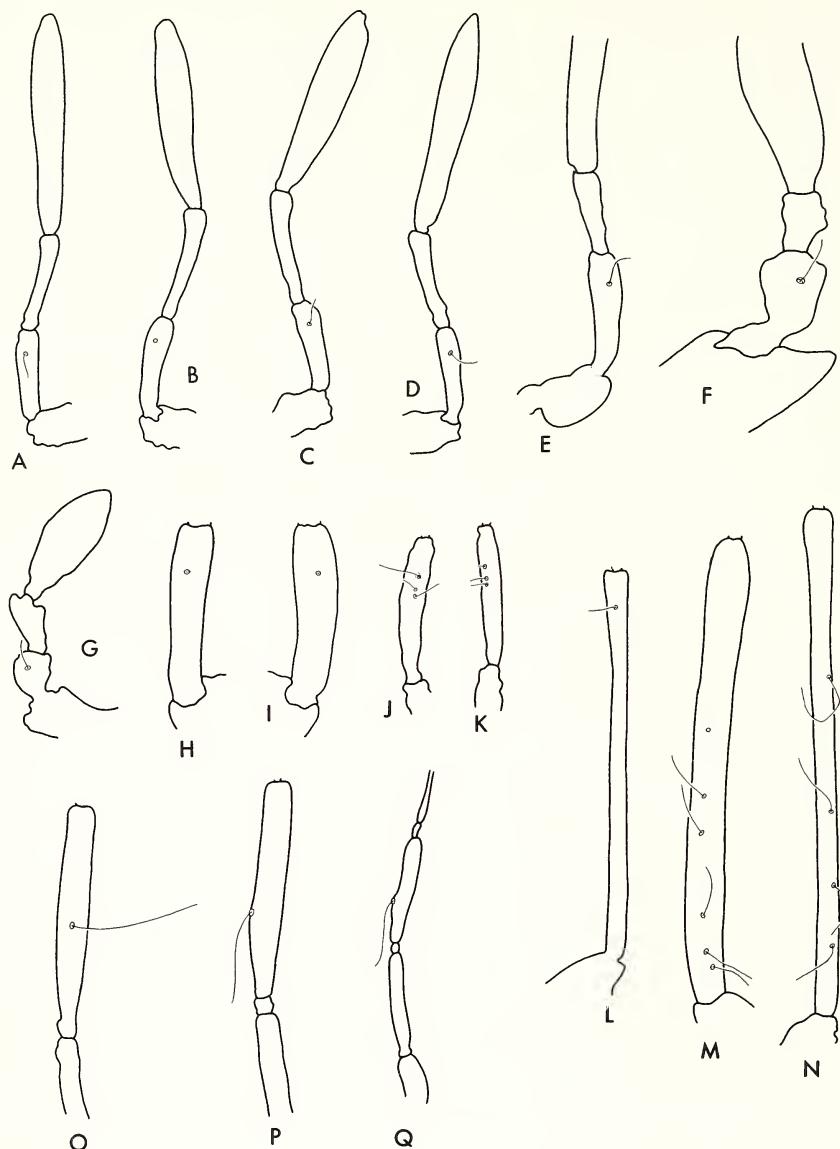


Fig. 6. Reduviidae—Phymatinae. A-D. *Phymata pennsylvanica*, ♂ and ♀. E. *Anthylla nervosopunctata*. F. *Paragreutus aethiopicus*. G. *Macrocephalus tuberosus*. H, I. *Phymata stali*. Reduviidae—Physoderinae. J, K. *Physoderes* sp. Reduviidae—Centrocneminae. L. *Centrocnemus* sp. Reduviidae—Piratinae. M. *Chryxus* sp. N. *Psophis* sp. Pachynomidae. O-Q. *Aphelinotus* sp., article 3.

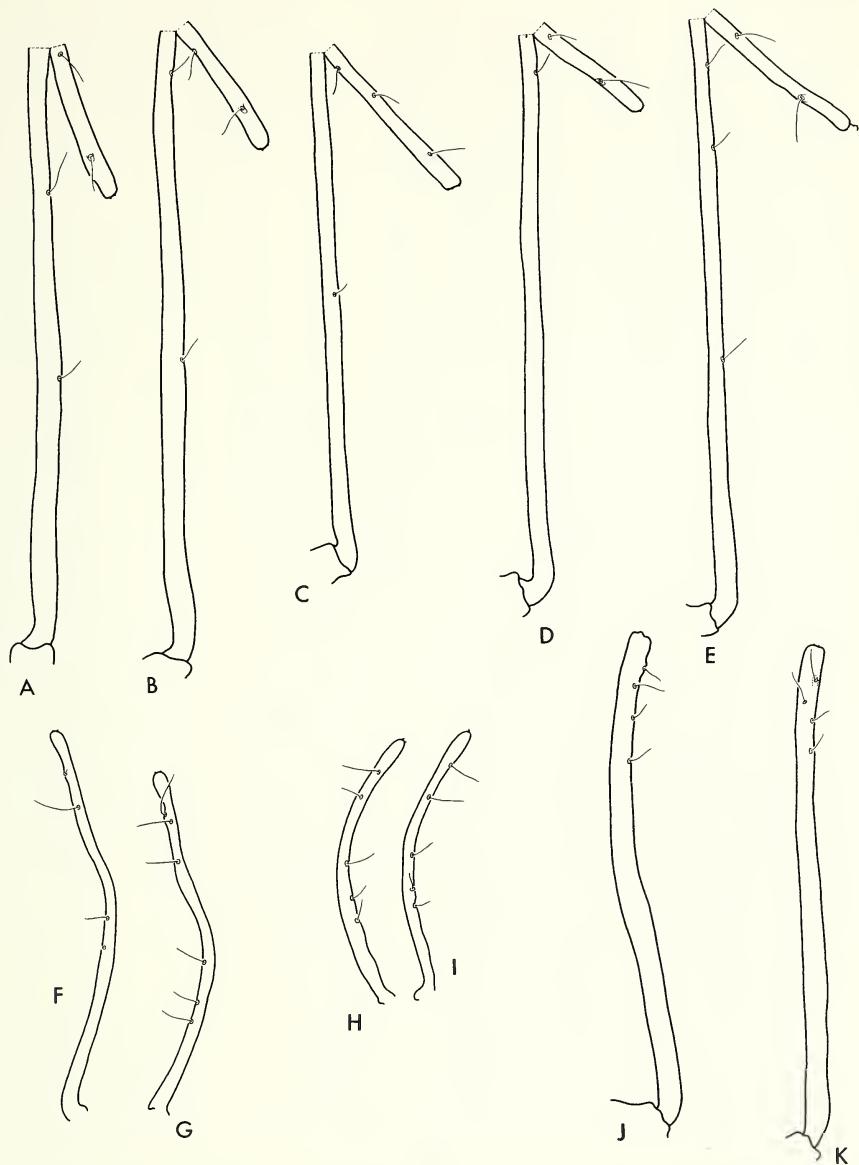


Fig. 7. Reduviidae—Stenopodainae. A–C. *Oncoccephalus nubilis*. D, E. *Stenopoda cinerea*. F–I. *Pnirontis languida*, ♂ and ♀. J, K. *Kodormus bruneosus*.

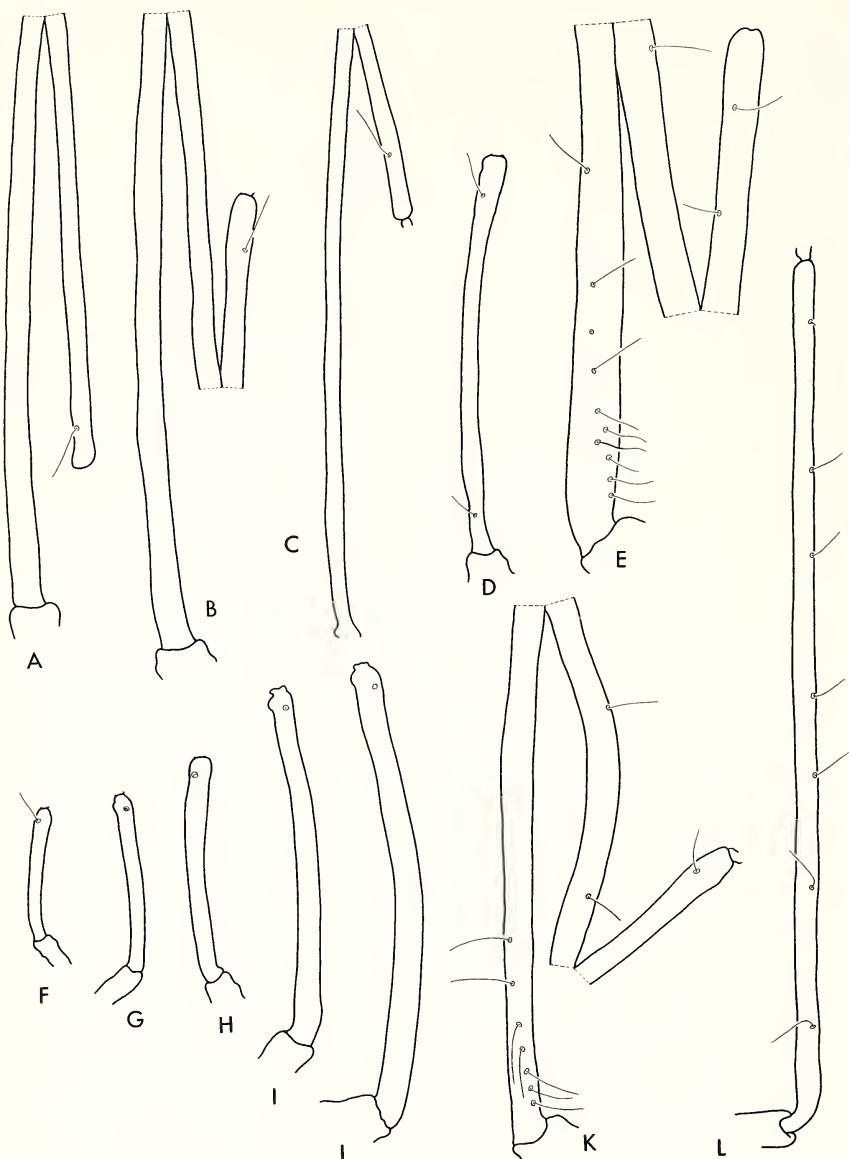


Fig. 8. Reduviidae—Microtominae. A, B. *Microtomus purcis*. C. *Microtomus gayi*. D. *Homalocoris* sp. Reduviidae—Sphaeridopinae. E. *Sphaeridops amoenus*. Reduviidae—Salyavatinae. F–J. Salyavatinae, 1st–5th instars. K. *Salyavata nigrofasciata*. Reduviidae—Emesinae. L. *Stenolemus pallidipennis*.

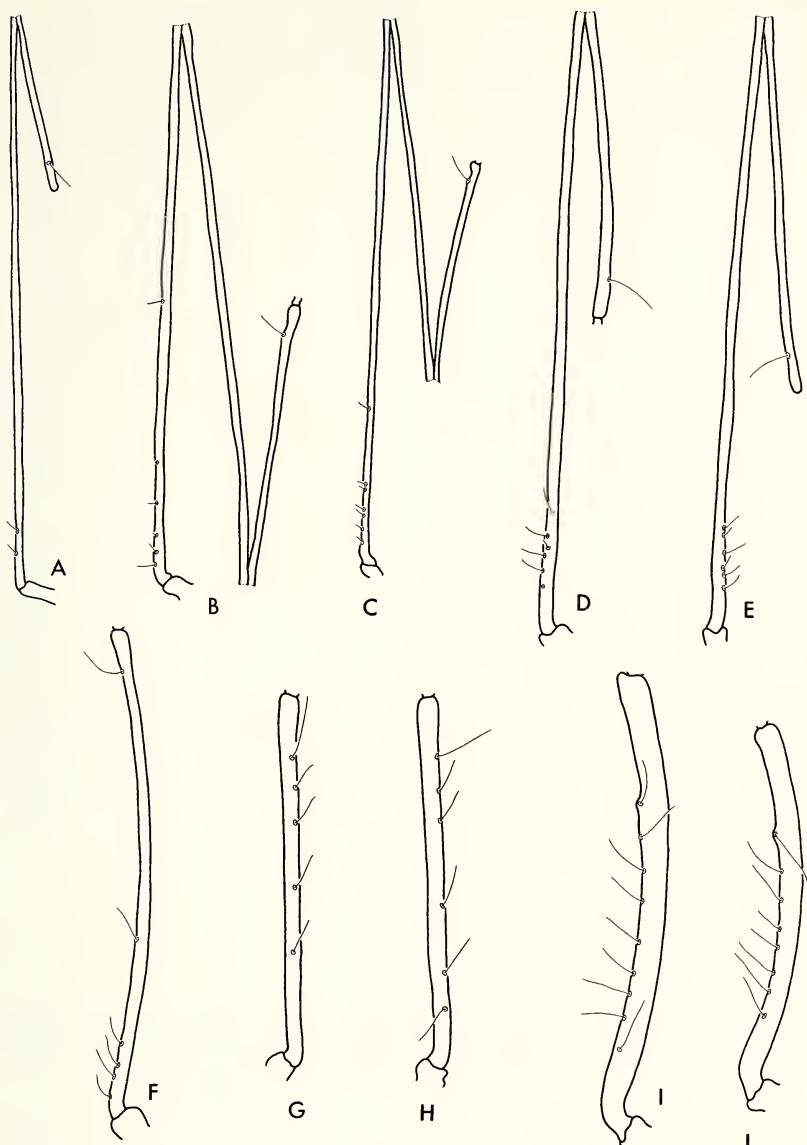


Fig. 9. Reduviidae—Emesinae. A. *Ploiaria chilensis*. B. *Bettyella marita*. C. *Bergemesa bachmanni*. D, E. *Barce fraternus*. Reduviidae—Saicinae. F. *Saica apicalis*. G, H. *Gallobelgicus* sp. I, J. *Oncerotrachelus acuminatus*.

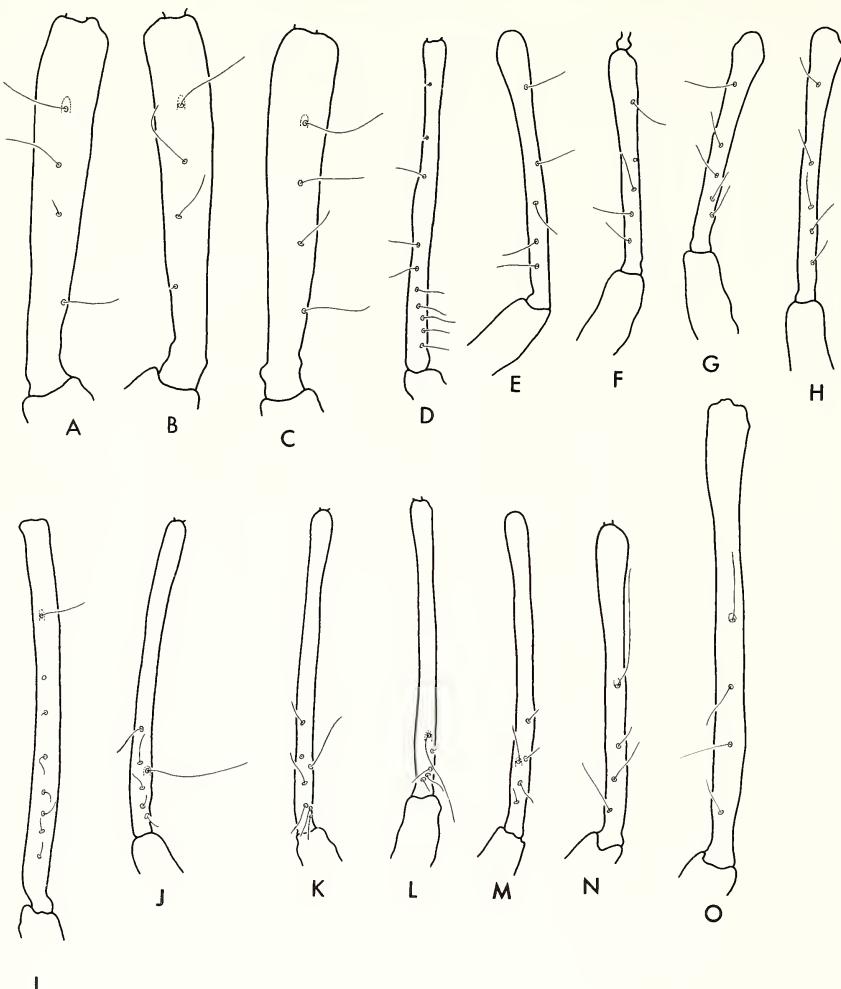


Fig. 10. Reduviidae—Cetherinae. A–C. *Cethera* sp., ♀ and ♂. Reduviidae—Reduviinae. D. *Inara flavopicta*. Reduviidae—Cetherinae. E–H. *Eupheno pallens*, ♂ and ♀. I. Tribelocephalinae sp. Reduviidae—Vesciinae. J–M. ?*Pessoaria piratoides*. N, O. *Vescia* sp., ♂ and ♀.

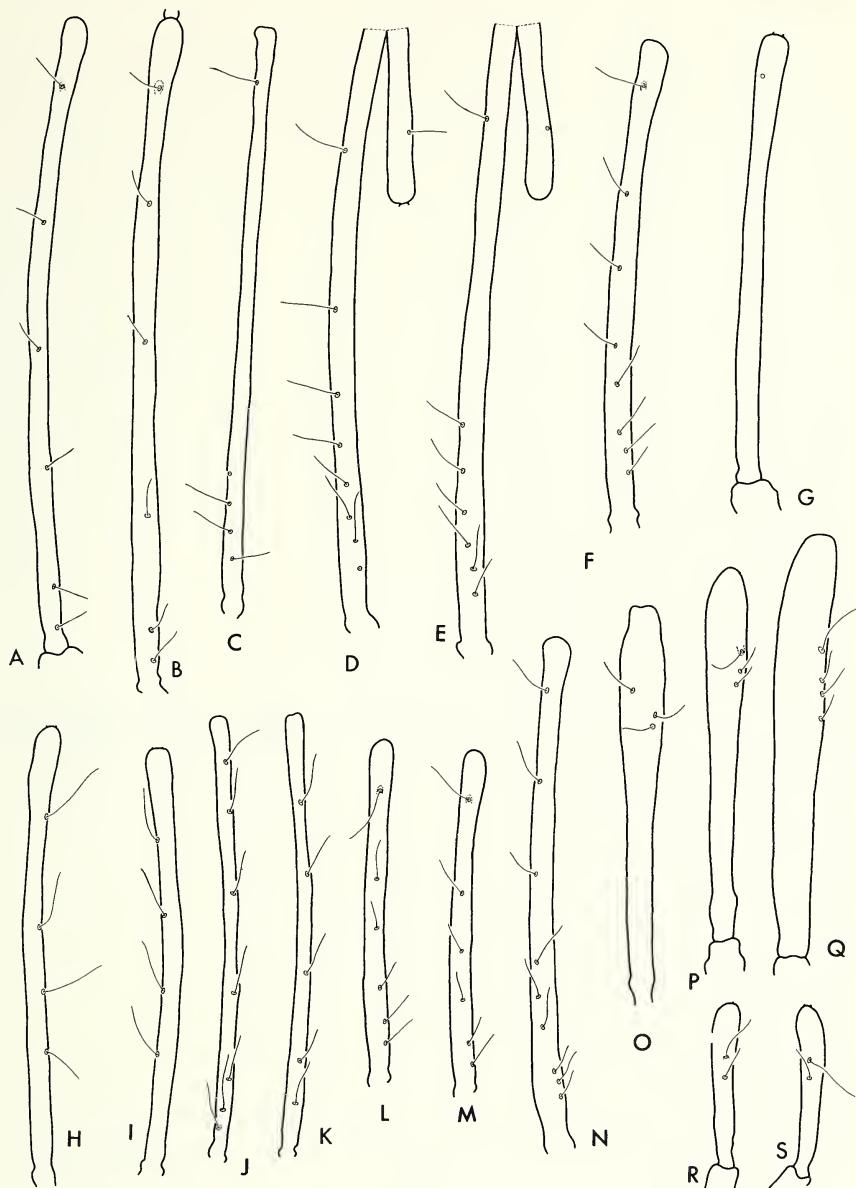


Fig. 11. Reduviidae—Reduviinae. A, B. *Velitra philippina*. C. *Zelurus weyrauchi*. D, E. *Zelurus circumcinctus*. F. *Leogorus formicarius*. G. *Leogorus formicarius*, 5th instar. H, I. *Pasira perpusilla*. J, K. *Reduvius personatus*. L–N. *Leogorus litura*. O–Q. *Sphedanovarus cameronensis*. R, S. *Microlestria* sp.

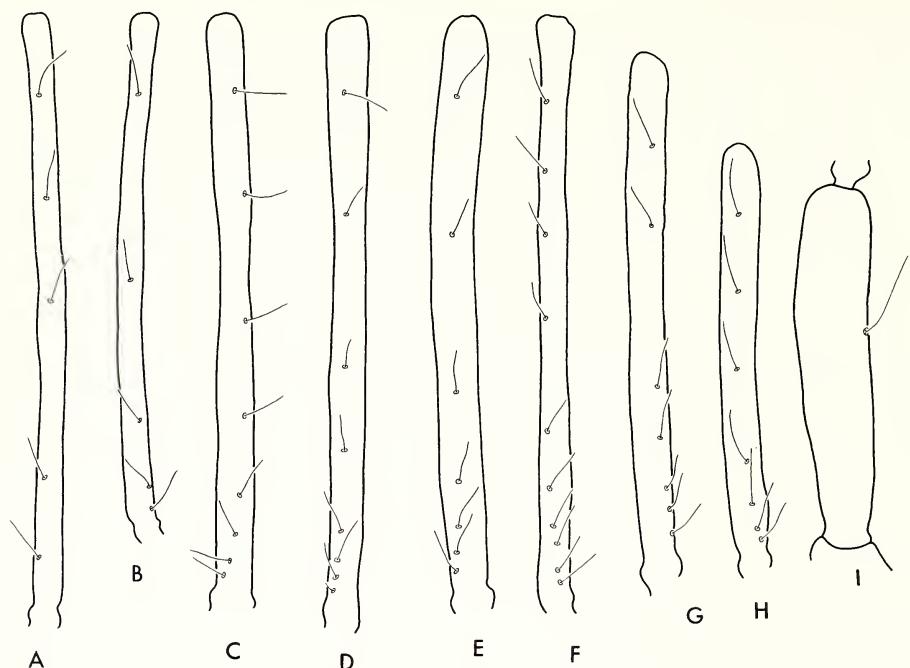


Fig. 12. Reduviidae—Triatominae. A, B. *Panstrongylus chinai*. C. *Panstrongylus megistus*. D, E. *Triatoma infestans*. F. *Triatoma vitticeps*. G, H. *Triatoma platensis*. I. *Belminius peruvianus*.

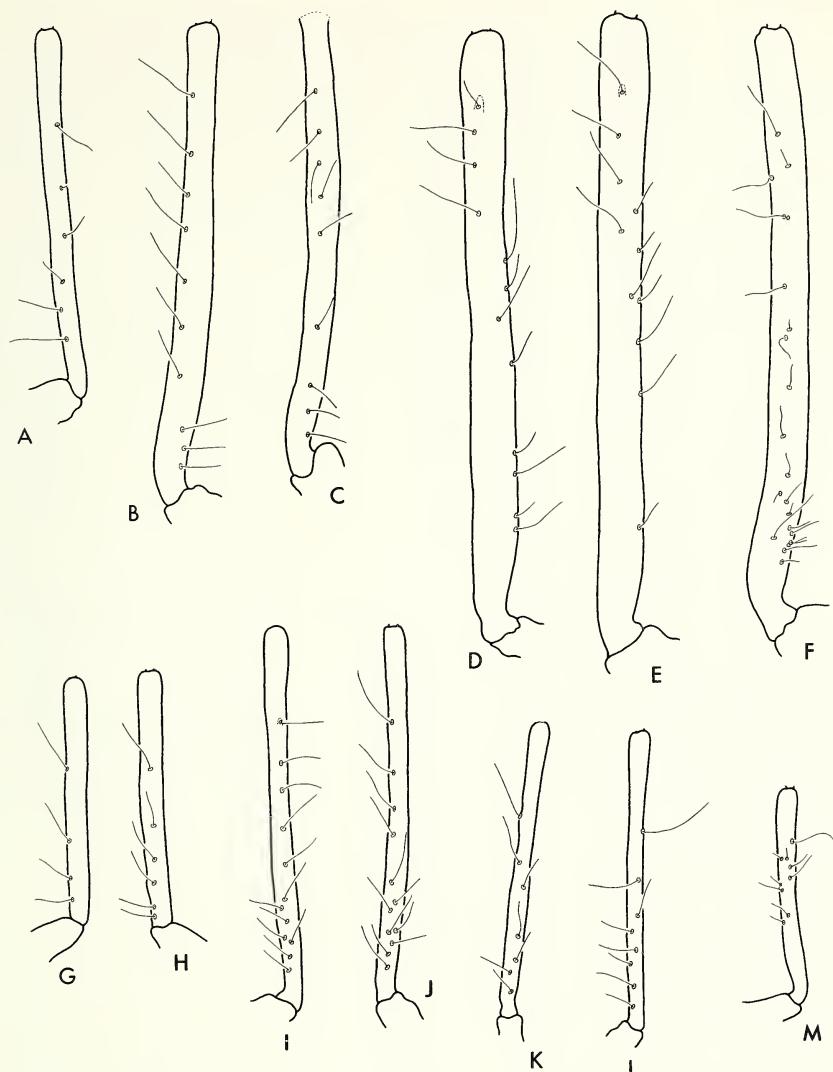


Fig. 13. Reduviidae—Ectrichodiinae. A. *Pothea lugens*. B, C. *Cricetopareis tucumana*, ♂ and ♀. D, E. *Ectrichodia crux*, ♂ and ♀. F. *Vilius* sp. G, H. *Daraxa* sp. I, J. *Racelds* sp. K, L. *Bayerus* sp. M. *Katanga etiennei*.



Fig. 14. Reduviidae—Piratinae. A, B. *Rasahus sulcicollis*. C. *Rasahus biguttatus*. D. *Sirthenea flavipes*. E. *Peirates santus*. F. *Catamiarus brevipennis*. G. *Melanolestes abdominalis*. H. I. *Ectomocoris caudatus*. J, K. *Rasahus hamatus*. L. *Brachysandalus ephippiger*. M. *Nalata* sp. N. *Tydides rufus*.

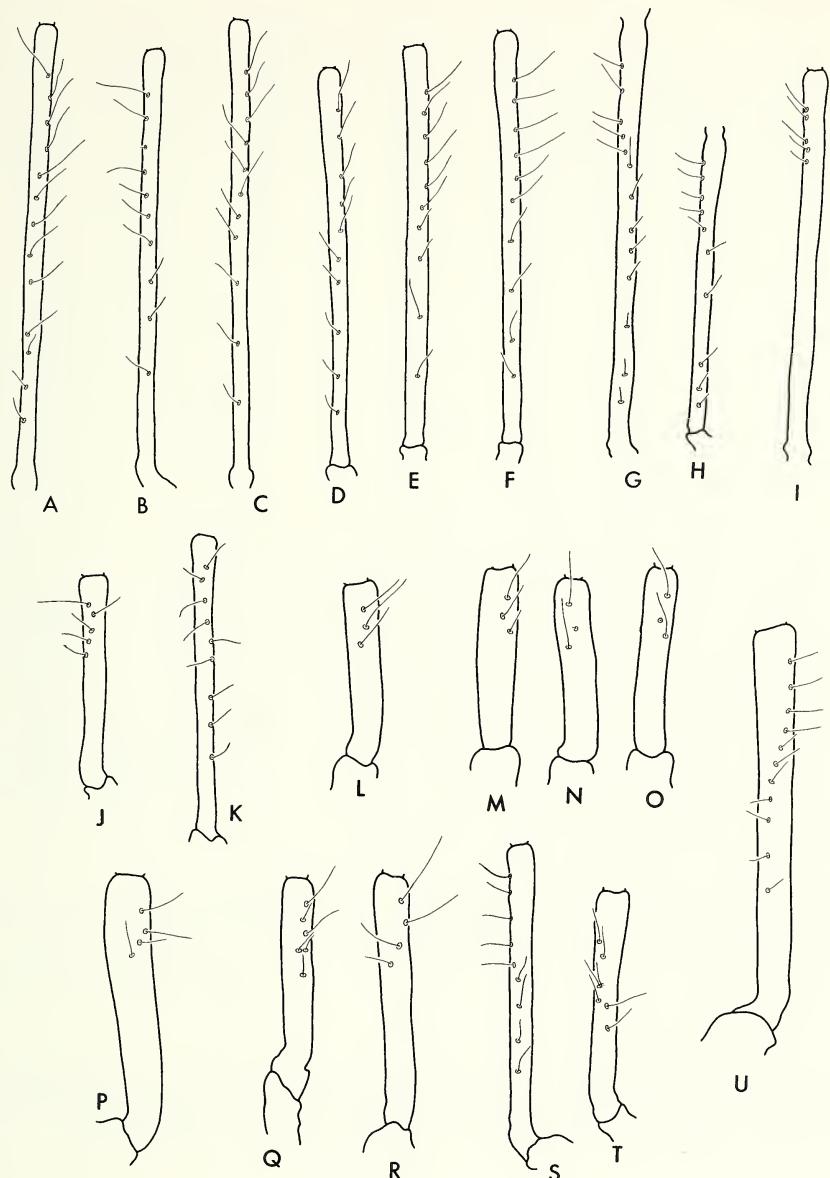


Fig. 15. Reduviidae—Harpactorinae. A–F. *Ricolla quadrispinosa*. G, H. *Zelus exsanguis*. I. *Rhaphidosoma didiera*. J, K. *Castolus ferox*, ♂ and ♀. L–O. *Amphibolus venator*, 1st instar. P. *Amphibolus venator*, 5th instar. Q. *Notocyrtus* sp., 1st instar. R. *Castolus lineatus*, 1st instar. S. *Castolus lineatus*. T. ?*Repipta flavicans*, 5th instar. U. *Arius* sp., 5th instar.

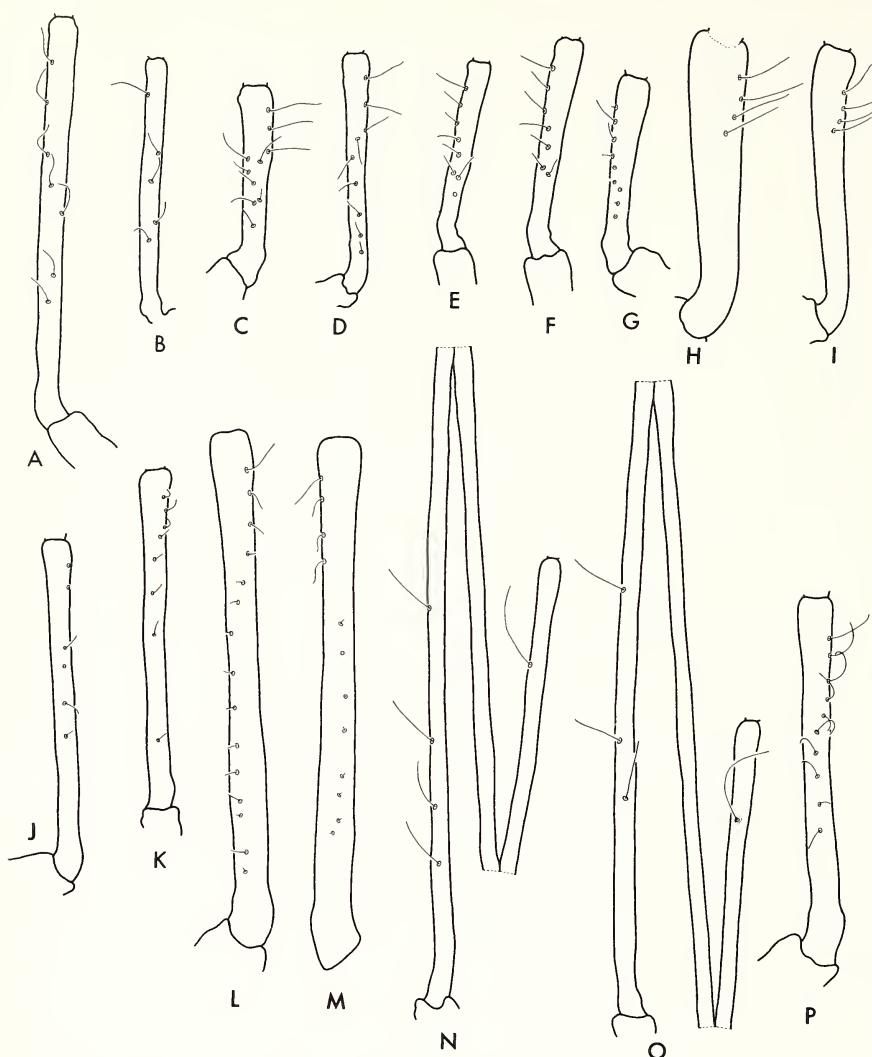


Fig. 16. Reduviidae—Harpactorinae. A, B. *Sinea diadema*, ♂ and ♀. C, D. *Atrachelus cinereus*, ♀. E-G. *Notocyrtus* sp., ♂ and ♀. H, I. *Amphibolus venator*, ♂ and ♀. J. *Yolinus* sp. K. *Havinthus rufovarius*. L, M. *Arilus* sp. N, O. *Bactrodes femoratus*. P. *Erbessus* sp.

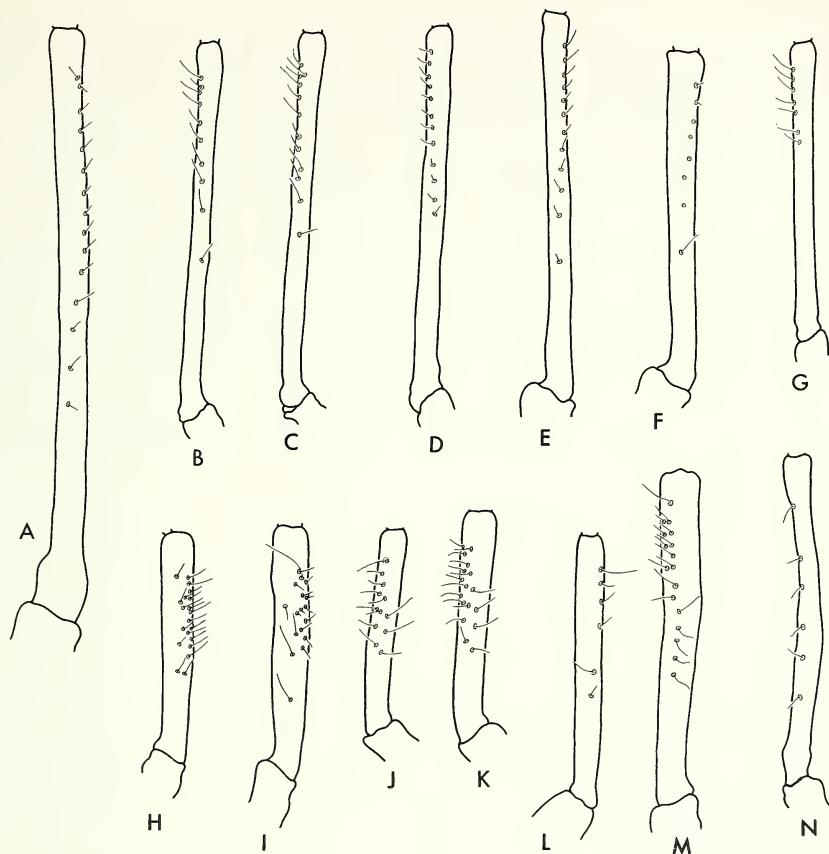


Fig. 17. Reduviidae—Apiomerinae. A. *Manicocoris* sp., ♂. B, C. *Heniartes maestralis*, ♀ and ♂. D, E. *Heniartes flavicans*, ♂ and ♀. F. *Heniartes cythromerus*, ♀. G. *Heniartes* sp., 5th instar. H, I. *Agriocoris* sp., ♀ and ♂. J, K. *Apiomerus* sp., ♀ and ♂. L. *Amauroclopius* sp., ♀. M. *Calliclopius* sp., ♂. N. *Micrauchenus* sp.

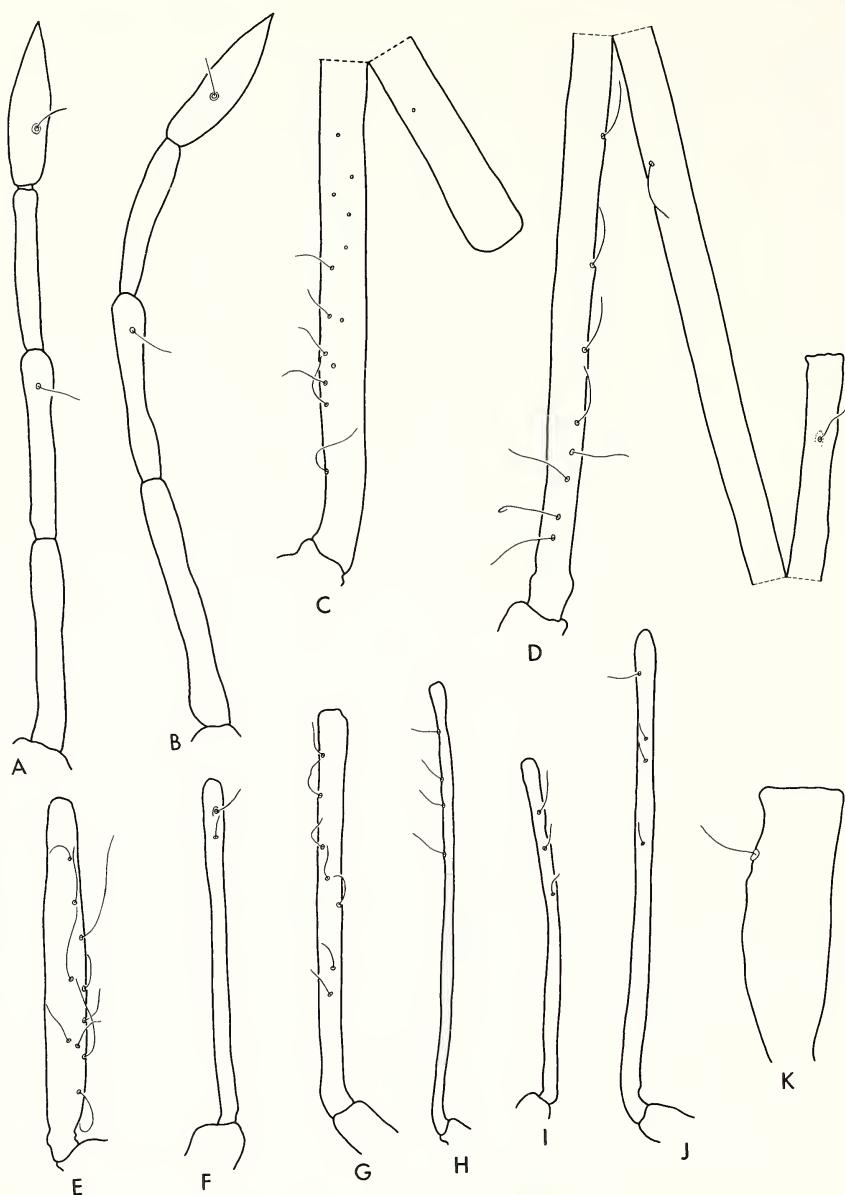


Fig. 18. Reduviidae—various subfamilies. A, B. *Empicoris rubromaculatus*, 1st instar. C. *Zirta limbata*. D. *Zelurus spinidorsis*. E. *Fusius rubricosus*. F. *Apronius* sp. G. *Sinea diadema*, ♀. H. *Polytoxus* sp. I. *Staccia* sp. J. *Ctenotrachelus* sp. K. *Phimophorus spissicornis*.

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